Service
Service
Service

LC03E Miravision

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Miravision Range

Supplement Manual to LC03E (3122 785 13571)

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Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:
1.1 Introduction

1.1 Introduction

The Philips Mirror TV combines an interactive flat LCD TV together with the reflectivity of a mirror to provide an innovative 2 -in -1 product for the customer.

The Mirror TV comes in several different models:
- 17" Hallway 17HM8801
- 23" Hallway 23HM8801
- 23" Full screen 23HM8821

The Mirror TV product utilizes the existing LCD TV technology of the Philips 17" and 23" LCD models, and therefore it provides many of the same features. For familiarity purposes, the existing Directions For Use (DFU) documentation for the 17" and 23" LCD models can also be used for the Mirror TV. Some differences may apply, and these differences will be covered in the enclosed addendum sheet and Installation Guide (separately available via the ITV organisation).

The MiraVision Installation Guide describes:
- How to replace the decorative frame of the Mirror TV
- How to wall mount the Mirror TV
- Technical specifications of main components
- Connectivity overview

This supplement service manual describes various elements specific to the Mirror TV application. For common repairs on the electronics of the LCD panel reference is made to the service manual LC03E - 3122 785 13571.
ComPair and SearchMan files are available with release 2003-3 (GB, DE and FR versions).
The information in this document is subject to change.
Accessories are subject to availability.

For further specifications see service manual LC03E 3122 785 13571.

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions
2.2 Warnings
2.3 Notes

2.1 Safety Instructions

Safety regulations require that **during** a repair:

- Connect the set to the mains via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the strain relief of the mains cord for proper function.
- Check the electrical DC resistance between the mains plug and the secondary side (only for sets which have a mains isolated power supply):
  1. Unplug the mains cord and connect a wire between the two pins of the mains plug.
  2. Set the mains switch to the "on" position (keep the mains cord unplugged!).
  3. Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch "off" the set, and remove the wire between the two pins of the mains plug.
- Check the cabinet for defects, to avoid touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories. “Dolby”, “Pro Logic” and the “double-D symbol”, are trademarks of Dolby Laboratories.

2.3.2 Schematic Notes

- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads (μ= x10^{-6}), nano-farads (n= x10^{-9}), or pico-farads (p= x10^{-12}).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.3.3 Rework on BGA (Ball Grid Array) ICs

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device Removal

As is the case with any component that, it is essential when removing an (LF)BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB.
To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area Preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device Replacement
The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

More Information
For more information on how to handle BGA devices, visit this URL: *http://www.atyourservice.ce.philips.com* (needs subscription). After login, select “Magazine”, then go to “Workshop Information”. Here you will find Information on how to deal with BGA-ICs.

2.3.4 Lead Free Solder

Philips CE is going to produce lead-free sets (PBF) from 1.1.2005 onwards.

Figure 2-1 Lead-free logo

This sign normally has a diameter of 6 mm, but if there is less space on a board also 3 mm is possible.

Regardless of this logo (is not always present), one must treat all sets from this date onwards according to the following rules.

Due to lead-free technology some rules have to be respected by the workshop during a repair:
- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able
  - To reach at least a solder-tip temperature of 400°C.
  - To stabilise the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C - 380°C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to avoid mixed regimes. If not to avoid, clean carefully the solder-joint from old tin and re-solder with new tin.
- Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.
- Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened short before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-)pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90°C) for drying (think of ESD-protection!). **Do not re-use BGAs at all**!
- For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will be available till the end of the service period. For the repair of such sets nothing changes.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:
- Always use the highest temperature to solder, when using SAC305 (see also instructions below).
- De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website *www.atyourservice.ce.philips.com* (needs subscription, but is not available for all regions)
You will find this and more technical information within the "Magazine", chapter "Workshop information".
For additional questions please contact your local repair help desk.

2.3.5 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

3.1 Introduction

For familiarity purposes, the existing Directions For Use (DFU) documentation for the LCD models can also be used for the Mirror TV.
Some differences may apply, and these differences will be covered in the Installation Guide (separately available via the ITV organisation).

You can download the LC4.6E information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

Index of this chapter:

4.1 Introduction
4.2 Precautions
4.3 Handling broken mirror glass
4.4 Removing the mirror glass
4.5 Removing Back Cover
4.6 Internal Cabling
4.7 Handling of the Display
4.8 Mounting the Display Back in Place
4.9 How to Replace IR Sensor

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Follow the disassemble instructions in described order.

4.1 Introduction

The Mirror TV product utilizes the existing LCD TV technology of the Philips 17" and 23" LCD models, and therefore it provides many of the same features. For familiarity purposes, the existing Directions For Use (DFU) documentation for the 17" and 23" LCD models can also be used for the Mirror TV. Some differences may apply, and these differences will be covered in the enclosed addendum sheet and Installation Guide (separately available via the ITV organisation).

- How to replace the decorative frame of the Mirror TV
- How to wall mount the Mirror TV

4.2 Precautions

Before starting to service:

- Place a clean dry soft cloth on the table, to avoid damaging the frame.
- Only open the mirror TV in a clean environment. Avoid ingress of dust, particularly on back of mirror.
- Wear gloves to service the set due to extreme sensitivity to damages of the mirror and frame.
- Do not touch the rear side of the glass with bare hands.
- Due to the special surface used on the rear of the mirror, surface should only be cleaned with a clean dry cloth (DO NOT USE any cleaning agents or solvents).
- MiraVision TVs should be received for repair without customized frames fitted, as Philips cannot be held liable for any damage done during service to customers' own frames. Frames are attached to the TV by screws from behind.
- Packaging: Keep one of each box size at each service centre (standard Outer packaging). Packaging is available via Euroservice warehouse (see spare parts list).

4.3 Handling broken mirror glass

When a MiraVision TV is sent to service for replacement of a broken mirror glass, it is important to follow safety guidelines to avoid any risk of injury:

- Carefully remove all loose pieces of broken glass.
- Remove display from frame, following guidelines given above, watch out for loose glass fragments.
- Once display is removed, carefully remove the broken mirror glass.
- Check for damage to the display. If badly damaged (i.e. impact on image quality is likely), consider replacement.
- Insert replacement glass, wearing soft gloves to avoid risk of damage or marks.

4.4 Removing the mirror glass

If it becomes necessary to remove the mirror glass (e.g. due to damage, or breakage), the screws securing the display (and the display) must be removed (see section Display Removal). In the case of the hallway models, there are additional securing screws (M3x4.5) used to hold the upper mirror in place (i.e. not just the screws that hold the display in place). These must also be removed.

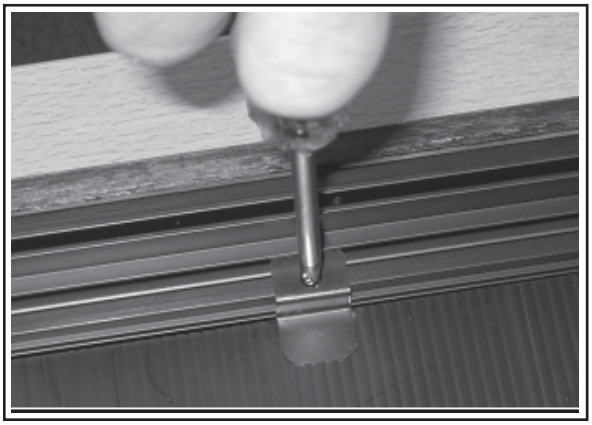

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Figure 4-1 Mirror glass removal

4.5 Removing Back Cover

Remove back cover, by opening the screws (M4x5) located at the center back of the cover.

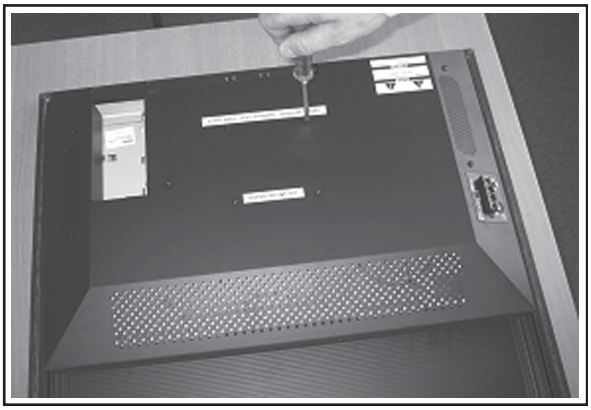

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Figure 4-2

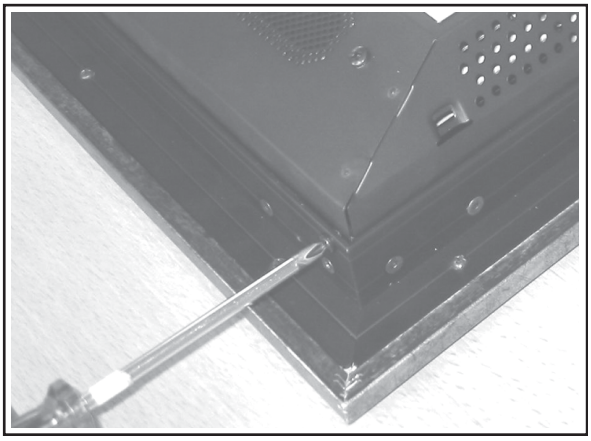

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Figure 4-3

Remove the screws (M4x5) located at the sides of the metal frame.

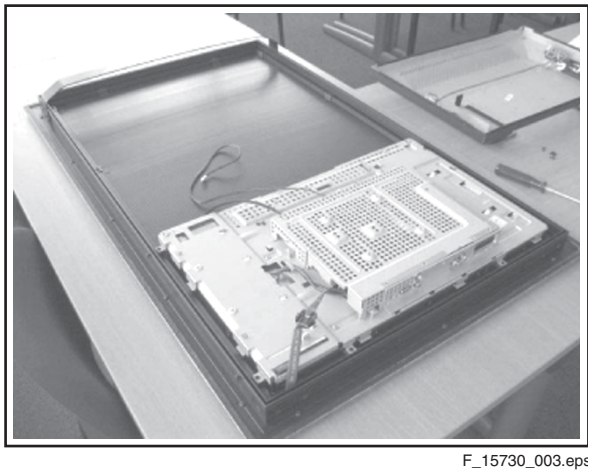

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Figure 4-4

4.6 Internal Cabling

Disconnect the cables from the LCD display to back cover. Two cables must be disconnected when removingthe back cover (speakersa and STBY switch).

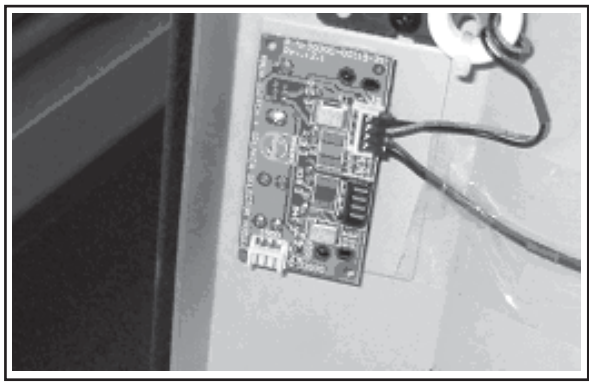

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Figure 4-5

4.7 Handling of the Display

Once removed from the mirror TV, the display and LC4.6E chassis can be accessed and repaired in the normal way (see LC4.6E service manual). But again, do not remove the display from the set, unless the fault relates to the LCD panel.

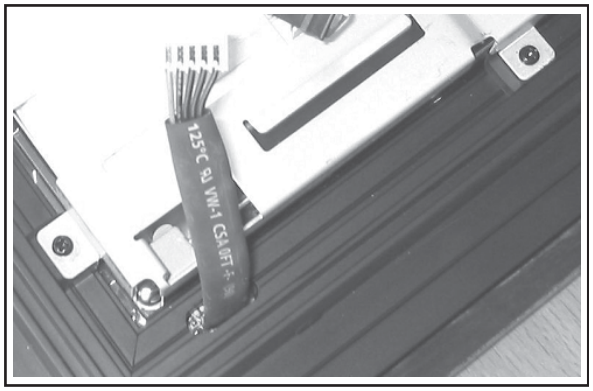

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Figure 4-6

Note: The display has a strip of foam attached to it all around the perimeter of the front face, to allow even contact with the front part of the mirror TV aluminum frame.

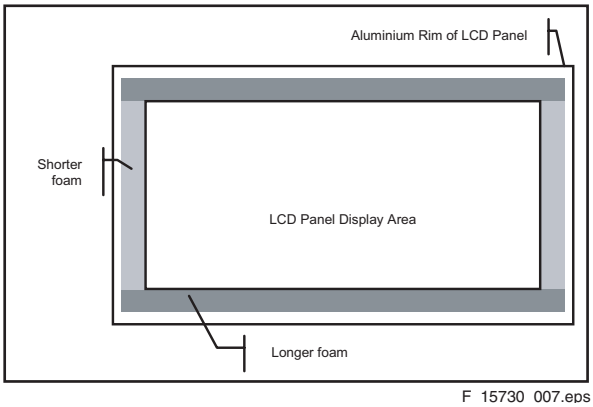

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Figure 4-7 Front part

The function of foam is to give some pressure to the glass to prevent dust penetrating between glass and LCD panel, and to ensure even contact between glass and frame.

Foam dimensions are 400x10x3 (long side), 227.6x10x3 (short side) for the 17" panel and 528x10x3 (long side), 305.6x10x3 (short side) for the 23" panel.

4.8 Mounting the Display Back in Place

When placing the display back in position, it is important to lower it carefully back into place (establish a firm hold on the display/ chassis), minimising risk of scratching or damaging the rear surface of the mirror glass.

Care should be taken not to over tighten the screws, in order to avoid possible deformation of the glass and image distortion.

Note:
Before returning the defective LCD panel take care for total removal of the foam. Use a hair dryer to warm the space between the foam and the frame so that the foam can be torn off easily. Residual glue can be removed with some alcohol.

4.9 How to Replace IR Sensor

Access of IR sensor is only possible when decorative frame is removed. Instructions about replacing the decorative frame are given in chapter 3 of the Mirror TV Installation Guide.

The IR sensor is removed by removing a securing screw (M3x4.5) at the front of the aluminium frame. The connection cable passes through the hole provided in the aluminium frame, allowing full removal and replacement of the IR sensor. **Take care that screws of correct length (self tapping D3.5x12.5) are used if fitting a customised frame** (they should not penetrate front of the frame). Normally, the workshop will not receive the set with customized frames fitted.

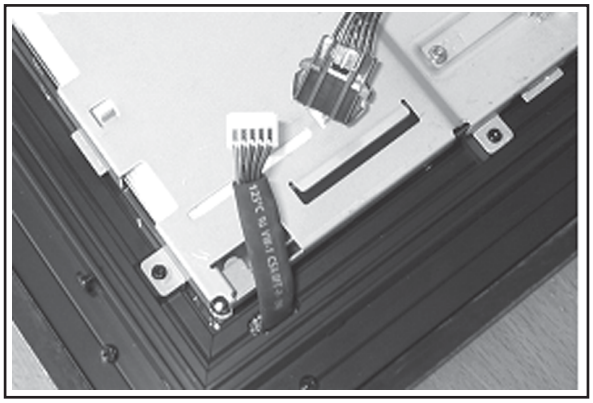

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Figure 4-8

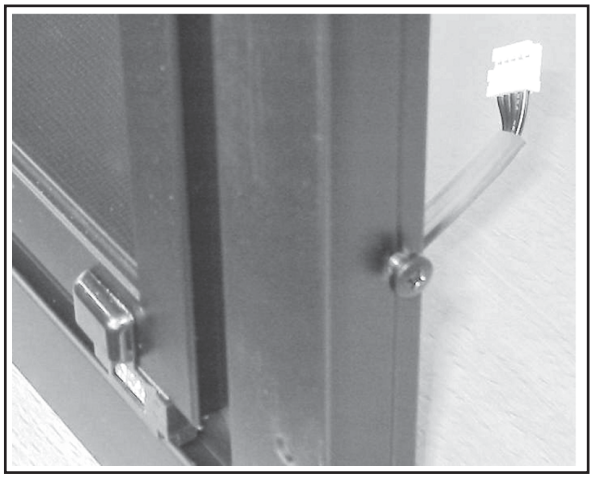

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Figure 4-9

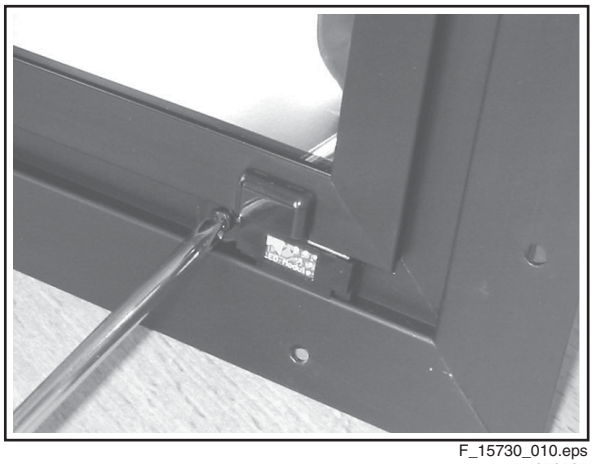

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Figure 4-10

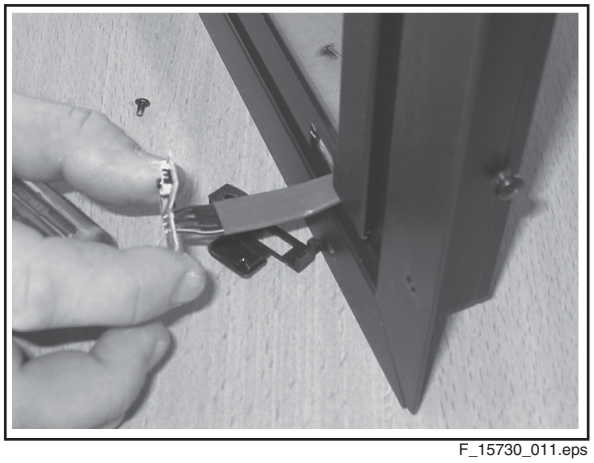

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Figure 4-11

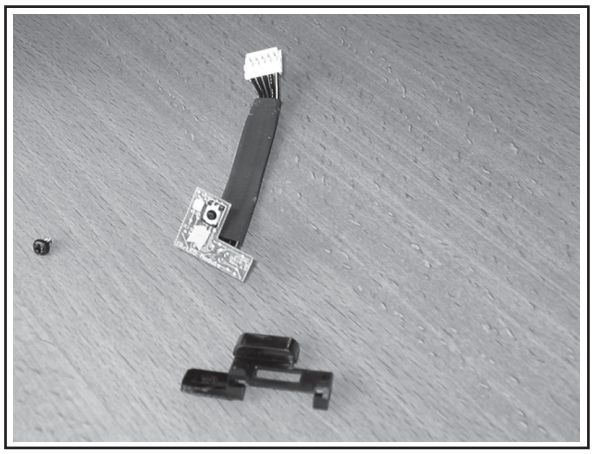

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Figure 4-12

5. Service Modes, Error Codes, and Fault Finding

5.1 ICONN Switch

Check the position of the ICONN switch if Mirror TV does not respond to the Remote control. See also Annex B of the Mirror TV Installation guide.

Normally signals from the remote control go directly to the Mirror TV (left side picture). After rerouting the remote control signals and installing the connectivity box, remote control commands have to go via the connectivity box to the Mirror TV (right side picture).

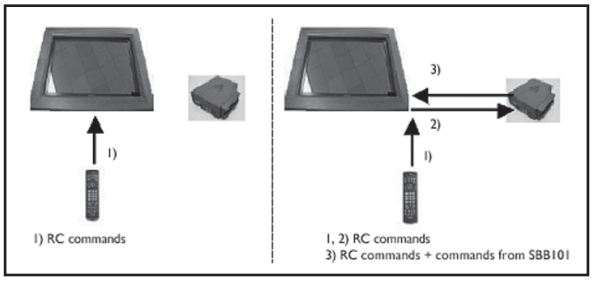

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Figure 5-1

Locate the small hole at the rear side of the Mirror TV as indicated in the following picture:

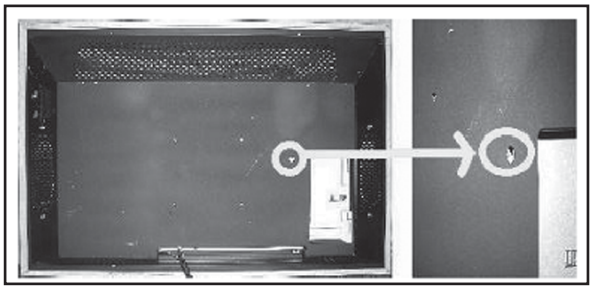

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Figure 5-2

Use a paperclip or thin screwdriver to (de)press the switch located behind the small hole. The switch must be put in position B to reroute the RC commands.

Now the Mirror TV will only operate with the Connectivity box connected.

For further service modes, error codes, and fault finding see service manual LC03E 3122 785 14711

6. Block Diagrams, Test Point Overviews, and Waveforms

See service manual LC03E 3122 785 13571

7. Circuit Diagrams and PWB Layouts

See service manual LC03E 3122 785 13571

8. Alignments

See service manual LC03E 3122 785 13571

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

See service manual LC03E 3122 785 13571

10. Spare Parts List

3139 128 77371	Speaker assy for 23” DBB298N
3139 128 77381	Speaker assy for 17" DBC298N
3139 124 01411	Cable tie - ferrite ring
3139 188 69022	Speaker switch assy
3139 188 69032	IR module with wire assy
3139 124 61561	IR lens
3139 124 90111	Mirror TV glass 17HW
3139 124 90121	Mirror TV glass 23HW
3139 124 90131	Mirror TV glass 23FS
3139 123 22111	Foam LCD17 400x10x3
3139 123 22121	Foam LCD17 227.6x10x3
3139 123 22131	Foam LCD23 305.6x10x3
3139 123 22141	Foam LCD23 528x10x3
3139 123 01241	Wooden decorative frame 17HW
3139 123 01261	Wooden decorative frame 23HW
3139 123 01251	Wooden decorative frame 23FS
3139 120 41641	Screws - self tapping D3.5x12.5
3128 147 14871	Remote Control
3139 126 83101	Packing (outer box with buffers) 17HW
3139 126 83081	Packing (outer box with buffers) 23HW
3139 126 83091	Packing (outer box with buffers) 23FS

11. Revision List

Manual xxxx xxx xxxx.0

- First release.